

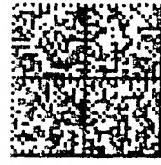
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APPLICATION NO.	FILED DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,377	02/04/2008	Nigel Boast	031280-000020	8851
7590	11/05/2009			
Robert E Krebs Thelen Reid & Priest LLP P O Box 640640 San Jose, CA 95164-0640			EXAMINER MCKANE, ELIZABETH L	
			ART UNIT 1797	PAPER NUMBER
			MAIL DATE 11/05/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/593,377	BOAST ET AL.
	Examiner ELIZABETH L. MCKANE	Art Unit 1797

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 27 August 2009.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 5-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 5-23 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ . | 6) <input type="checkbox"/> Other: _____ . |

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 27 August 2009 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 5-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nadkarni (US 2004/0202570) in view of Palermo (US 6,481,219) and Cumberland (WO 03/089017).

Nadkarni teaches a method of sterilizing a closed environment wherein the method includes restricting access to the closed environment (para [0031] and [0042]), generating gaseous ozone into the environment at a concentration of 1-100 ppm (para [0036]), increasing the humidity of the closed environment (para [0028]), maintaining the ozone for a predetermined time period (para [0036] and [0041]), and depleting the ozone using a kiln (para [0041]). Nadkarni further discloses that after “[o]n reaching the

safe ozone concentration, independent testing company personnel enter the sealed area...." (paragraph [0042]). Thus, there is an inherent step of "signaling" that the safe ozone concentration has been achieved, through detectors or other known means. The safe ozone concentration is disclosed to be "no more than 0.08 ppm." See para [0036].

As set forth above, Nadkarni discloses the use of ozone having a concentration of 1-100 ppm for an "effective time". See paragraph [0036]. As both concentration and contact time are known result effective variables, it would have been obvious to one of ordinary skill in the art to optimize a known result effective variable in order to optimize treatment parameters according to economics and contamination level. Optimization of such variables is well-within the purview of one in the art in the absence of unexpected results.

Although Nadkarni discloses destroying the gaseous ozone after treatment with a kiln and/or scrubber, Nadkarni is silent with respect to use of a catalytic converter for destruction of the ozone. Palermo evidences that it was known in the art at the time of the invention to use a catalytic converter for the conversion of ozone back to oxygen at the end of an ozone sterilization cycle. See col.3, lines 9-11. Specifically, Palermo discloses an ozone destroyer **90** which can be a thermal destroyer, like that of Nadkarni, or alternatively a catalytic converter where the catalyst is manganese dioxide or activated carbon. See col.5, lines 24-30. Such catalysts reduce the ozone concentration to less than 1 ppm (col.5, lines 34-36). As Palermo teaches that a catalytic converter is capable of reducing the ozone concentration to very low levels and moreover, is a functional equivalent of the thermal means of Nadkarni, it would have

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been obvious to one of ordinary skill in the art to substitute the catalytic converter of Palermo for the kiln of Nadkarni.

Nadkarni utilizes a portable, truck-mounted apparatus (para [0025]) which is not insertable into the closed environment. Cumberland, however, teaches a portable, wheeled ozone generator for treatment of closed environments. See Figure 1 and page 19, line 34 to page 20, line 16. As Cumberland further discloses that the wheeled cart of Figure 1 is a functional equivalent of a truck-mounted apparatus (page 21, lines 6-7), it would have been obvious to supply the apparatus of Nadkarni on a wheeled cart, in the manner of Cumberland, when treating smaller spaces.

4. Claims 12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nadkarni, Palermo, and Cumberland as applied to claim 11 above, and further in view of Hannant (EP 0693289).

With respect to claim 12, Nadkarni is silent with respect to how the signaling is accomplished. Hannant discloses a sterilization system wherein a remote unit 2 signals the end of the sterilization cycle as well as any fault conditions. See Abstract. The signal can be in the form of a light 25 or other visible display and/or an audible alarm 24. See page 2, line 55 to page 3, line 6. As both visible and audible signals are well-known in the art of sterilization, their use would have been both obvious and expected in the combination above.

As to claims 14 and 15, Nadkarni discloses treatment of "any type of building or vessel such as a ship" (para [0017]). Thus, one of ordinary skill in the art would have

found it obvious to apply the method of Nadkarni to the treatment of any building/vessel or part thereof in need of sterilization.

With respect to claim 16, while Nadkarni teaches that when the entire building/vessel is being treated the ventilation system can be used to circulate the ozone throughout the building. However, when treating only a single area of the building, it would have been obvious to seal the area, as taught by Nadkarni, and to keep the ventilation system turned off, in order to prevent unwanted circulation of the ozone to parts of the building/vessel outside of the area being treated.

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nadkarni, Palermo, and Cumberland as applied to claim 11 above, and further in view of Braun, Jr. (US 2003/0127506).

The combination *supra* teaches the known use of visual signaling means in a sterilization system. LEDs are not specified. However, Braun, Jr. discloses a sterilization system wherein LEDs **50,52** are used to indicate both current state and failure of the system. See paragraphs [0033] and [0040]. As LEDs would have been a well-known type of visual signaling means, their use would have been obvious in the invention of the combination.

6. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nadkarni (US 2004/0202570).

With respect to claim 17, Nadkarni teaches a sterilizer including a humidifier **12**, a gaseous ozone generation means **36**, an ozone depletion means **40**, a movement means **18**, and detectors for the ozone concentration and humidity (para [0015]). With

respect to a timer, Nadkarni discloses that "selecting the concentration of ozone and time period to kill the spores" (para [0015]) and use of an electrical control panel, it would have been obvious to one of ordinary skill in the art to utilize a timer as part of the control panel for the selection of the treatment time period. Automation of such processes is within the purview of one of ordinary skill in the art.

As to claim 18, any timer is capable of actuating the ozone generation after a delay. This is merely an intended use of the timer.

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nadkarni as applied to claim 18 above, and further in view of Palermo.

Although Nadkarni discloses an ozone depletion means (kiln and/or scrubber), the reference is silent with respect to use of manganese dioxide. Palermo evidences that it was known in the art at the time of the invention to use a catalytic converter for the conversion of ozone back to oxygen at the end of an ozone sterilization cycle. See col.3, lines 9-11. Specifically, Palermo discloses an ozone destroyer **90** which can be a thermal destroyer, like that of Nadkarni, or alternatively a catalytic converter where the catalyst is manganese dioxide. See col.5, lines 24-30. Such catalysts reduce the ozone concentration to less than 1 ppm (col.5, lines 34-36). As Palermo teaches that a catalytic converter is capable of reducing the ozone concentration to very low levels and moreover, is a functional equivalent of the thermal means of Nadkarni, it would have been obvious to one of ordinary skill in the art to substitute the catalytic converter of Palermo for the kiln of Nadkarni.

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8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nadkarni and Palermo as applied to claim 19 above, and further in view of Cumberland.

As to system of Nadkarni is truck-mounted, it does not include a handle.

Cumberland, however, teaches a portable, wheeled ozone generator for treatment of closed environments having a handle to assist with pushing the apparatus. See Figure 1 and page 19, line 34 to page 20, line 16. As Cumberland further discloses that the wheeled cart of Figure 1 is a functional equivalent of a truck-mounted apparatus (page 21, lines 6-7), it would have been obvious to supply the apparatus of Nadkarni on a wheeled cart, in the manner of Cumberland, when treating smaller spaces.

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nadkarni, Palermo, and Cumberland as applied to claim 20 above, and further in view of Hannant.

Nadkarni is silent with respect to a particular signaling means. Hannant discloses a sterilization system wherein a remote unit **2** signals the end of the sterilization cycle as well as any fault conditions. See Abstract. The signal can be in the form of a light **25** or other visible display and/or an audible alarm **24**. See page 2, line 55 to page 3, line 6. As both visible and audible signals are well-known in the art of sterilization, their use would have been both obvious and expected in the combination above.

10. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nadkarni, Palermo, Cumberland, and Hannant as applied to claim 20 above, and further in view of Braun, Jr..

With respect to claim 22, the above combination discloses the known use of visual signaling means in a sterilization system. LEDs are not specified. However, Braun, Jr. discloses a sterilization system wherein LEDs **50,52** are used to indicate both current state and failure of the system. See paragraphs [0033] and [0040]. As LEDs would have been an well-known type of visual signaling means, their use would have been obvious in the invention of the combination.

As to claim 23, Palermo discloses an ozone destroyer **90** which can be a thermal destroyer, like that of Nadkarni, or alternatively a catalytic converter where the catalyst is activated carbon. See col.5, lines 24-30. Such catalysts reduce the ozone concentration to less than 1 ppm (col.5, lines 34-36). As Palermo teaches that a catalytic converter is capable of reducing the ozone concentration to very low levels and moreover, is a functional equivalent of the thermal means of Nadkarni, it would have been obvious to one of ordinary skill in the art to substitute the catalytic converter of Palermo for the kiln of Nadkarni.

Response to Arguments

11. Applicant's arguments with respect to the new claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELIZABETH L. MCKANE whose telephone number is (571)272-1275. The examiner can normally be reached on Mon-Fri; 5:30 a.m. - 2:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 571-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Elizabeth L McKane/
Primary Examiner, Art Unit 1797

elm
2 November 2009

Notice of References Cited		Application/Control No. 10/593,377	Applicant(s)/Patent Under Reexamination BOAST ET AL.	
		Examiner ELIZABETH L. MCKANE	Art Unit 1797	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,481,219	11-2002	Palermo, Henry William	62/51.1
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N	EP0693289A2	01-1996	EP	HANNANT	_____
	O					
	P					
	Q					
	R					
	S					
	T					

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*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	V	
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	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
 Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Receipt date: 08/27/2009

INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Not for submission under 37 CFR 1.99)</i>		Application Number	10593377
		Filing Date	2008-02-04
		First Named Inventor	Nigel Boast
		Art Unit	1797
		Examiner Name	Elizabeth L. McKane
		Attorney Docket Number	431280-020

/ELM/	6	VAUGHN ET AL., "Inactivation of Human and Simian Rotaviruses by Ozone", Applied and Environmental Microbiology, Sept. 1987, Vol. 53, No. 9, pp. 2218-2221	<input type="checkbox"/>
	7	SATO ET AL., "Virucidal Effect of Ozone Treatment of Laboratory Animal Viruses", Jikken Dobutsu, Experimental Animals, April 1990, 39(2), pp. 223-229	<input type="checkbox"/>
	8	BOLTON ET AL., "Biological Effects of Ozone Aerosol on Five Groups of Animal Viruses", Abstract of the annual meeting of the American Society for Microbiology, Meeting 1980, Vol. 167, pp. 280 Q89	<input type="checkbox"/>
	9	SUPHACHAI ET AL., "Capsid Functions of Inactivated Human Picornaviruses and Feline Calicivirus", Applied and Environmental Microbiology, Jan. 2003, 69(1), pp. 350-357	<input type="checkbox"/>
	10	SUPHACHAI ET AL., "Ultraviolet Inactivation of Feline Calicivirus, Human Entericviruses and Coliphages", Photochemistry & Photobiology 2002, 76(4), pp. 406-410	<input type="checkbox"/>
	11	DOULTREE ET AL., "Inactivation of Feline Calicivirus, A Norwalk Virus Surrogate", J. Hosp. Infect., Jan. 1999, Vol. 41, No. 1, pp. 51-57	<input type="checkbox"/>
↓	12	International Search Report, Application No. PCT/CA2005/000412, filed 2005-03-18	<input type="checkbox"/>

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Examiner Signature	/Elizabeth L. McKane/	Date Considered	11/02/2009
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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

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/ELM/	3	2120628	CA		1993-04-15	Langford et al.	<input type="checkbox"/>
	4	2459041	CA	A1	2003-04-10	Potember et al.	<input type="checkbox"/>
	5	2001286542	JP	A2	2001-10-16	Furuta et al.	<input type="checkbox"/>
↓	/ELM/ 6	2443046	CA	A1	2005-03-26	Bedard et al.	<input type="checkbox"/>

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
/ELM/	1	ISHIZAKI, ET AL., "Inactivation of Bacillus spores by gaseous ozone" The Journal of Applied Bacteriology 1988 60(1), pp. 67-72	<input type="checkbox"/>
	2	MASAOKA ET AL., "Ozone Decontamination of Bioclean Rooms", Applied and Environmental Microbiology, Mar. 1982, Vol. 43, No. 3, pp. 509-513	<input type="checkbox"/>
	3	ELFORD ET AL., "An Investigation of the Merits of Ozone as an Aerial Disinfectant", Journal of Hygiene 1942, 42, pp. 240-265	<input type="checkbox"/>
	4	SHIN ET AL., "Reduction of Norwalk Virus, Poliovirus 1, and Bacteriophage MS2 by Ozone Disinfection of Water", Applied and Environmental Microbiology, July 2003, Vol 69, No. 7, pp. 3975-3978	<input type="checkbox"/>
↓	/ELM/ 5	KESWICK ET AL., "Inactivation of Norwalk Virus in Drinking Water by Chlorine", Applied and Environmental Microbiology, Aug. 1985, Vol. 50, No. 2, pp. 261-264	<input type="checkbox"/>

Receipt date: 08/27/2009

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (06-09)

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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/ELM/	1	20040047776	A1	2004-03-11	James M. Thomsen	
	2	20020085950	A1	2002-07-04	Simon Rebaille	

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/ELM/	1	3933620	DE	A1	1991-11-04	Peter Worwag		<input checked="" type="checkbox"/>
/ELM/	2	0172432	WO	A1	2001-04-10	David Alan Sands et al.		<input type="checkbox"/>

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/ELM/	3	1500404	EP	A1	2005-01-26	Alan Mole et al.	<input type="checkbox"/>
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	1	Supplemental European Search Report, Application No. 05730000.7, completed 2008-02-28	<input type="checkbox"/>

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⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

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Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (07-09)

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U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
/ELM/	1	5501844		1996-03-26	Kasting, Jr. et al.	
/ELM/	2	5368816		1994-11-29	Detzer	

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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
		20040202570	A1	2004-10-14	Nakami	

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FOREIGN PATENT DOCUMENTS								
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
/ELM/	1	2311386	CA	A1	1999-06-03	Nelson et al.		<input type="checkbox"/>
/ELM/	2	2270512	CA	A1	2000-10-30	Dufresne et al.		<input type="checkbox"/>



(19)

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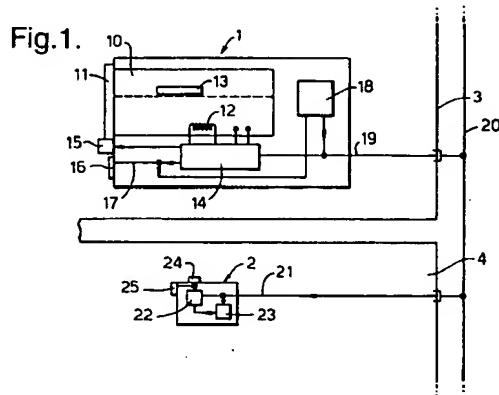
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(54) Sterilizer apparatus

(57) A sterilizer has an alarm 2 for indicating the end of a sterilization cycle and any fault. The alarm 2 is located remote from the sterilizer unit 1 itself, such as in a different room. The sterilizer unit 1 has a transmitter 18 that transmits signals to the remote alarm 2, such as via a mains electricity cable 19, or via an optical, ultrasonic or radio link.



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Description

This invention relates to sterilizer apparatus of the kind including a sterilizer unit in which articles to be sterilized can be placed and an alarm for indicating the end of a sterilization cycle.

5 Sterilizers, such as autoclaves, are used to treat medical and surgical instruments so as to kill bacteria and viruses by the application of heat or radiation. Autoclaves have a pressure chamber into which the item to be treated is placed. Steam at elevated temperature and pressure is supplied to the chamber to sterilize the contents. It is important that the sterilizing cycle is completed before the instruments are removed. For this reason, the door of the sterilizer is locked automatically and cannot be opened until the sterilizing cycle is completed.

10 The time taken to sterilize instruments can be a considerable problem especially, for example, in small dental surgeries where there may not be sufficient stocks of some instruments. This can mean that surgery has to be delayed until sterilization has been completed. In many surgeries, the sterilizer is not in the surgery itself but in an adjoining anteroom. This is a problem because the dental surgeon or nurse has to go out of the surgery to check the sterilizer repeatedly to see if the sterilization cycle has been completed. This can be very wasteful of the time of the person involved.

15 It is an object of the present invention to provide improved sterilizer apparatus.

According to one aspect of the present invention there is provided sterilizer apparatus of the above-specified kind, characterised in that the alarm is a unit located remote from the sterilizer unit, that the sterilizer unit includes a transmitter that transmits a signal indicative of the end of a sterilization cycle, and that the alarm unit includes a receiver that receives 20 the signal and provides an indication of the end of the sterilizing cycle at a location remote from the sterilizer unit.

The transmitter may also transmit a signal indicative of a fault in the sterilizer unit, the alarm unit providing an indication of the fault. The transmitter may be connected to a mains electrical cable and transmit the signal along the cable to a mains power circuit, the alarm unit being connected to the mains power circuit so that it receives the signal via the circuit. Alternatively, the transmitter may include an optical emitter, the alarm unit including an optical receiver 25 that receives optical signals from the transmitter. In another arrangement, the transmitter may include an acoustic emitter, the alarm unit including an acoustic receiver that receives acoustic signals from the transmitter. The transmitter may alternatively include a radio transmitter, the alarm unit including a radio receiver that receives radio signals from the transmitter. The alarm preferably includes an audible alarm or a visual display operated when the signal is received from the sterilizer unit.

30 Sterilizer apparatus in accordance with the present invention, will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 shows schematically one embodiment of the apparatus; and

35 Figures 2 to 4 show alternative embodiments of the apparatus.

With reference to Figure 1, the sterilizer apparatus includes a mains-operated sterilizer unit 1 and a remote unit 2 located in different rooms 3 and 4.

The sterilizer unit 1 has a pressure chamber 10 that is closed by a door 11. A heating element 12 inside or outside 40 the chamber 10 produces steam at elevated temperature and pressure that effectively sterilizes instruments or other articles 13 placed within the chamber. A control unit 14 controls energization of the heating element 12 and provides conventional monitoring of the temperature and pressure in the chamber. The control unit 14 also controls a lock 15 on the door 11 that prevents the door being opened until the sterilization cycle has been completed. The sterilization unit 1 has a small display panel 16, which is connected to the control unit 14 by a line 17. The display 16 indicates when the 45 sterilization cycle is complete and shows any faults, such as failure to reach the operating temperature and pressure. As so far described, the sterilization unit 1 itself is conventional and may be similar to the sterilizers described in GB 2238407, GB 2237131 or GB 2237110.

The sterilization unit 1 differs from previous sterilizers in that it includes a transmitter 18 connected to the line 17 to receive a sample of the output from the control unit 14 to the display 16. The transmitter 18 converts the output on line 50 17 into a coded form at a frequency greater than that of the mains power supply and supplies the coded signal onto the mains supply cable 19 of the sterilizer unit 1. These coded signals are supplied onto the mains power ring circuit 20 supplying the building in which the unit 1 is installed.

The remote unit 2 also has a mains cable 21 and connects to the mains ring circuit 20 in the room 4 or in any other room in the building. The remote unit 2 has a drive unit 22 and a receiver/decoder 23 that decodes the coded signals 55 on the mains supply and produces an output to the drive unit 22. The remote unit 2 also has an audible alarm 24 that is energized by the drive unit 22 to produce an audible sound when a coded signal is received indicative of the end of the sterilization cycle. A light 25 or other visible display indicates visibly that the sterilization cycle has finished. When the decoder 23 receives a signal indicative that there is a fault on the sterilization unit 1, it controls the drive unit 22 to

sound the audible alarm 24 and to produce a different visible display indicative of a fault.

The remote unit 2 enables the dental surgeon, nurse or other user to be notified of when the sterilization cycle has finished even when they are not in the same room as the sterilizer unit. This can result in a considerable saving of time and ensures that the user is immediately aware when the instruments can be removed. If the remote unit also indicates 5 any fault, it enables this to be rectified quickly. Several remote units 2 could be installed in different rooms so that the user is notified wherever he might be.

The sterilizer apparatus could have various different forms of remote alarm unit. In the arrangement of Figure 2, the transmitter 18' in the unit 1' includes an infra-red emitter 30', such as an LED that emits coded infra-red pulses. The remote unit 2' has an infra-red receiver 26' that supplies electrical signals derived from the received infra-red signals to 10 the decoder 23'. This optical arrangement is only suitable where the remote unit 2' is within line-of-sight of the sterilizer unit 1', either directly or by reflection. The advantage of this arrangement, however, is that it can be battery powered and is, therefore, more portable.

Figure 3 shows an acoustic arrangement where the transmitter 18" in the unit 1" includes an ultrasonic emitter 30" that produces coded ultrasonic signals. The remote unit 2" has an ultrasonic microphone 26", or the like, which converts 15 received ultrasonic energy into electrical signals and supplies these to the decoder 23". This remote alarm unit 2" need not be used within sight of the sterilizer unit and it can be battery powered and portable. The remote unit 2" could be carried in a pocket or clipped to the user's clothing.

In the arrangement shown in Figure 4, the transmitter 18"" in the sterilizer unit 1"" is a radio transmitter that transmits short-range radio signals that are received by a receiver 26"" in the remote unit 2"".

20 The signal path between the sterilizer unit and the remote alarm unit need not be provided by mains wiring or by a wireless link. Instead, the two units could be connected by a low-voltage cable.

Claims

- 25 1. Sterilizer apparatus including a sterilizer unit (1, 1', 1", 1"') in which articles (13) to be sterilized can be placed and an alarm (2, 2', 2", 2"') for indicating the end of a sterilization cycle, characterised in that the alarm is a unit (2, 2', 2", 2"') located remote from the sterilizer unit (1, 1', 1", 1"'), that the sterilizer unit includes a transmitter (18, 18', 18", 18"') that transmits a signal indicative of the end of a sterilization cycle, and that the alarm unit includes a receiver (23, 23', 23", 23"') that receives the signal and provides an indication of the end of the sterilizing cycle at a location remote from the sterilizer unit.
- 30 2. Sterilizer apparatus according to Claim 1, characterised in that the transmitter (18, 18', 18", 18"') also transmits a signal indicative of a fault in the sterilizer unit (1, 1', 1", 1"'), and that the alarm unit (2, 2', 2", 2"') provides an indication of the fault.
- 35 3. Sterilizer apparatus according to Claim 1 or 2, characterised in that the transmitter (18) is connected to a mains electrical cable (19) and transmits the signal along the cable to a mains power circuit (20), and that the alarm unit (2) is connected to the mains power circuit (20) so that it receives the signal via the circuit.
- 40 4. Sterilizer apparatus according to Claim 1 or 2, characterised in that the transmitter (18') includes an optical emitter (30'), and that the alarm unit (2') includes an optical receiver (23', 26') that receives optical signals from the transmitter (18').
- 45 5. Sterilizer apparatus according to Claim 1 or 2, characterised in that the transmitter (18") includes an acoustic emitter (30"), and that the alarm unit (2") includes an acoustic receiver (23", 26") that receives acoustic signals from the transmitter (18").
- 50 6. Sterilizer apparatus according to Claim 1 or 2, characterised in that the transmitter (18"') includes a radio transmitter (30"'), and that the alarm unit (2"') includes a radio receiver (23"., 26"') that receives radio signals from the transmitter (30"').
- 55 7. Sterilizer apparatus according to any one of the preceding claims, characterised in that the alarm unit (2, 2', 2", 2"') includes an audible alarm (24) that is operated when the signal is received from the sterilizer unit (1, 1', 1", 1"').
8. Sterilizer apparatus according to any one of the preceding claims, characterised in that the alarm unit (2, 2', 2", 2"') includes a visual display (25) that is operated when the signal is received from the sterilizer unit (1, 1', 1", 1"').

Fig.1.

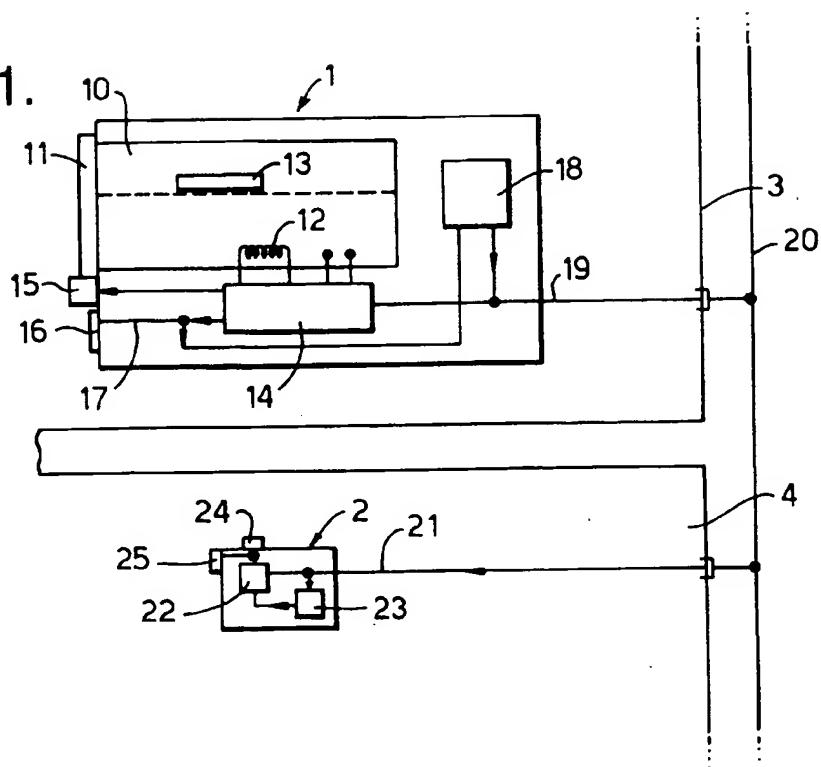


Fig.2.

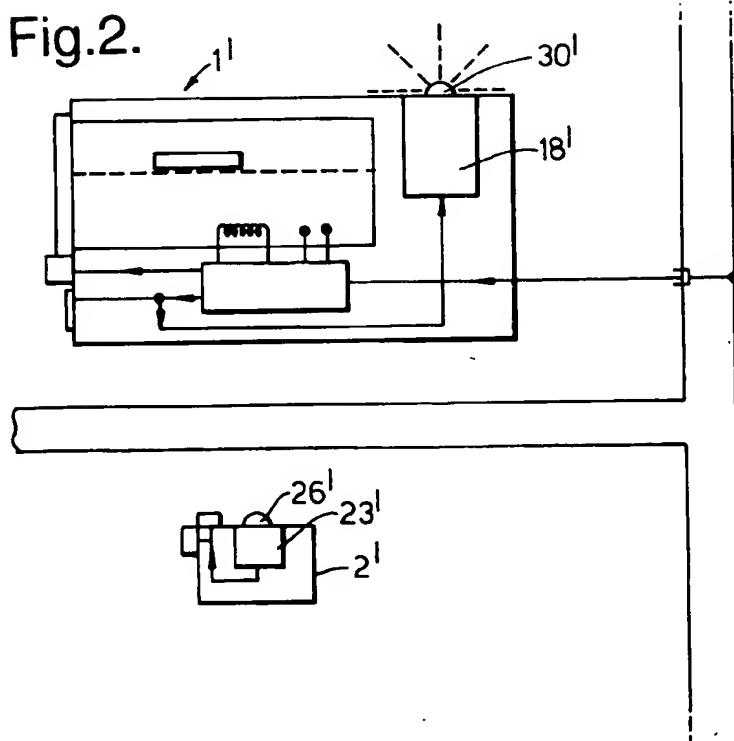


Fig.3.

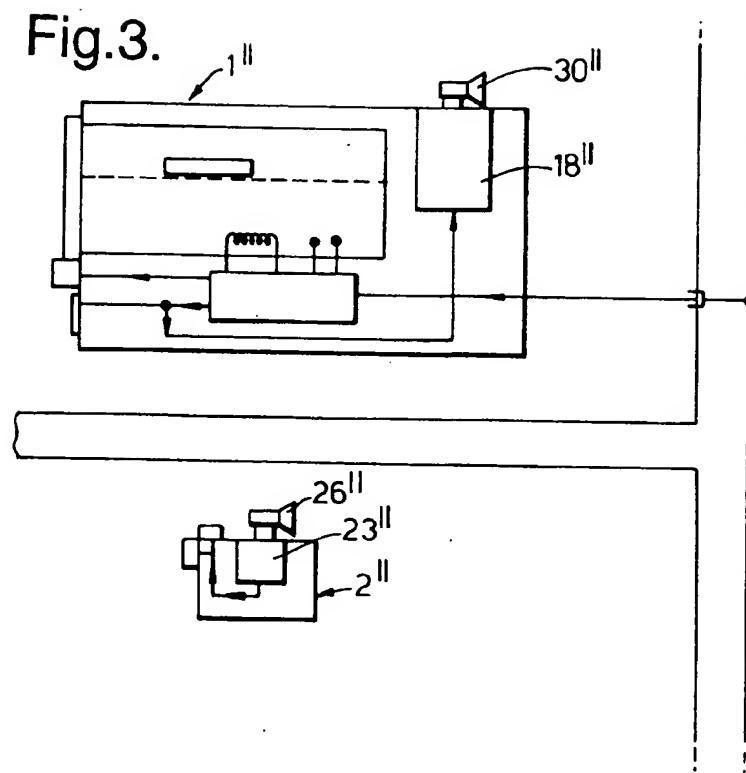


Fig.4.

